

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 3 of 27

#### **Amendments to the Claims**

This listing of claims will replace all prior versions, and listing, of claims in the application.

#### **Listing of Claims:**

Claim 1 (Canceled)

2. (Previously Presented) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode being formed on a second substrate for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein a proportion of a maximum value of the voltage applied to the pixel electrodes with respect to the voltage supplied to the signal lines becomes different depending on a polarity of the voltage applied to the pixel electrodes.

3. (Previously Presented) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 4 of 27

signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein the pulse width of a supplied voltage to the signal lines in the conduction period of the pixel switching elements when a positive polarity voltage is applied to the pixel electrodes is different from the pulse width of a supplied voltage to the signal lines in the conduction period of the pixel switching elements when a negative polarity voltage is applied to the pixel electrodes, when the same tone is being displayed.

4. (Previously Presented) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 5 of 27

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein an allocated time for a single scanning line is different for each polarity of the voltage applied to the pixel electrodes.

5. (Previously Presented) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein, with respect to an image display device having the common electrode for applying a common potential to the pixels and having a plurality of scanning lines for driving the pixel switching elements, liquid crystal is displaced according to a potential difference between the common electrode and the pixel electrodes so as to carry out display, and an amplitude of a voltage supplied to the signal lines is equal to an amplitude of a voltage supplied to the common electrode.

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 6 of 27

6. (Currently Amended) A method for driving an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels, said method controlling a voltage applied to the pixel electrodes in a conduction period of the pixel switching elements according to a pulse width supplied to the signal lines,

wherein, in the conduction period of the pixel switching elements, the voltage applied to the pixel electrodes is less than a voltage supplied to the signal lines, and

wherein a maximum value of an amplitude of the voltage applied to the pixel electrodes is in a range of not less than 80 percent and not more than 98 percent of an amplitude of a voltage supplied to the signal lines.

Claims 7 - 9 (Canceled)

10. (Previously Presented) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines, and polarities of pixels in a signal line direction are inverted alternately; and

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 7 of 27

wherein a potential difference between the potential of the signal lines and the potential of the common electrode is maximum at an end of one horizontal period.

11. (Previously Presented) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode, and polarities of pixels in a signal line direction are inverted alternately, and

wherein a potential difference between the potential of the signal lines and the potential of the common electrode is maximum at an end of one horizontal period.

12. (Previously Presented) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines, and polarities of pixels in a signal line direction are inverted alternately, and

wherein a potential difference between the potential of the signal lines and the potential of the common electrode is minimum at an end of one horizontal period.

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 8 of 27

13. (Previously Presented) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode, and polarities of pixels in a signal line direction are inverted alternately, and

wherein a potential difference between the potential of the signal lines and the potential of the common electrode is minimum at an end of one horizontal period.

Claims 14 - 37 (Canceled)

38. (Previously Presented) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines, and polarities of pixels in a signal line direction are inverted alternately, and wherein:

a phase of the common electrode is constant with respect to a scanning signal, and

tones are displayed by shifting phases of waveforms of the signal lines and the scanning lines so that the potential of the signal lines is switched between high level and low level after an

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/837,232  
Response to Office Action  
Page 9 of 27

elapsed time period which varies depending on the tone when the potential of the scanning lines is ON.

39. (Previously Presented) A method for driving an image display device, said method applying a voltage between a potential of signal lines and a potential of a common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode, and polarities of pixels in a signal line direction are inverted alternately,

wherein the waveform of the common electrode is off-phase by a certain degree with respect to the waveform of the scanning lines, and

wherein tones are displayed by shifting phases of waveforms of the signal lines and the common electrode so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON.

40. (Previously Presented) A driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 10 of 27

according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said driving device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said driving device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines, and

wherein:

a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and

the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines.

41. (Previously Presented) An image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according



Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 11 of 27

to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said image display device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said image display device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines, and

wherein:

a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and

the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the scanning lines, to the signal lines.

42. (Previously Presented) A driving device of an image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/831,232  
Response to Office Action  
Page 12 of 27

according to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said driving device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said driving device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the common electrode, to the signal lines, and

wherein:

a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and

the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the common electrode, to the signal lines.

43. (Previously Presented) An image display device which includes a plurality of pixel electrodes which are formed on a substrate, pixel switching elements which are individually connected to the pixel electrodes, a plurality of signal lines for applying a data signal according

Applicant: T. Yamamoto et al.  
U.S.S.N.: 09/832,232  
Response to Office Action  
Page 13 of 27

to a display image to the pixel electrodes, and a common electrode for applying a common potential to pixels,

said image display device applying a voltage between a potential of the signal lines and a potential of the common electrode when a potential of scanning lines is ON, and displaying tones by modulating a pulse width of a two-value voltage supplied to the signal lines,

wherein said image display device includes a signal line driving section for supplying a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period, according to tone data of the display image, with respect to a phase of a voltage waveform of the common electrode, to the signal lines, and

wherein:

a phase of a waveform of the common electrode has a constant phase difference with respect to a phase of a waveform of the scanning line, and

the signal line driving section supplies a signal, which is created by shifting a phase of a voltage waveform whose polarity is inverted per one horizontal period so that the potential of the signal lines is switched between high level and low level after an elapsed time period which varies depending on the tone when the potential of the scanning lines is ON, with respect to a phase of a voltage waveform of the common electrode, to the signal lines.

Claims 44 - 59 (Canceled)